

CLAIMS

1. A rotatable roller press and brush assembly for use within in a separator comprising:
 - a main arm having ends;
 - a main axle configured and disposed to rotatably carry the main arm between the ends;
 - at least one brush arm attached to and extending away from the main arm, each of the at least one brush arm being connected to a brush adjacent the end of the brush arm opposite the main arm;
 - at least one roller arm having a first end and a second end, the at least one roller arm being rotatably carried between the first end and the second end adjacent at least one of the ends of the main arm;
 - a roller being rotatably carried adjacent the first end of the at least one roller arm; and
 - a resilient force device connected to at least one roller arm and the main arm for urging the roller away from the main axle.
2. The rotatable roller press and brush assembly of claim 1 wherein the resilient force device is a spring.
3. The rotatable roller press and brush assembly of claim 2 wherein the spring is a torsion spring.
4. The rotatable roller press and brush assembly of claim 2 wherein the spring is a helical spring.
5. The rotatable roller press and brush assembly of claim 1 wherein the resilient force device is a spring assembly.
6. The rotatable roller press and brush assembly of claim 1, further comprising a plurality of main arms.
7. A manure separator comprising:
 - a shell;

an inlet comprising a slurry supply section for providing a slurry to the separator;

a first section within the shell comprising a first screen and a rotating brush assembly, the first section being adjacent to and in fluid communication with the inlet, the brush assembly comprising at least one first brush and at least one arm, each of the at least one first brush being attached to at least one arm, and each of the at least one arm being rotatably carried within the shell adjacent the first screen to direct solid slurry components of the slurry from the first section to a second section;

the second section within the shell adjacent to and in fluid communication with the first section, comprising a second screen and a rotating roller press and brush assembly being rotatably carried within the shell adjacent the second screen, the roller press and brush assembly comprising:

a main arm having opposed ends;

a main axle configured and disposed to rotatably carry the main arm between the opposed ends;

at least one brush arm attached to and extending away from the main arm, each of the at least one brush arm being connected to a second brush adjacent the end of the brush arm opposite the main arm;

at least one roller arm having a first end and a second end, the roller arm being rotatably carried between the first end and the second end adjacent at least one of the opposed ends of the main arm;

a roller being rotatably carried adjacent the first end of the at least one roller arm; and

a resilient force device connected to at least one roller arm and the main arm for urging the roller away from the main axle;

a driving means to urge rotational movement of the brush assembly and the roller press and brush assembly;

a sump in fluid communication with the first section and the second section for draining liquid slurry components of the slurry from the first section and the second section; and

a solids discharge section in communication with the second section for discharging solid slurry components of the slurry from the second section.

8. The separator of claim 7, wherein the shell further comprises a duct collar.
9. The separator of claim 7, wherein the shell further comprises clamshell doors.
10. The separator of claim 7, wherein the shell further comprises a plurality of channels, the channels being configured and disposed to accommodate forklift forks.
11. The separator of claim 7, wherein the rollers comprise ultra high molecular weight plastic.
12. The separator of claim 7, wherein the at least one arm has a central axis and each of the at least one first brush has an angle in the range of about 30 degrees to about 60 degrees between the central axis and the at least one first brush away from a direction of travel of the at least one first brush.
13. The separator of claim 12, wherein each of the at least one first brush is angled at about 45 degrees.
14. The rotatable roller press and brush assembly of claim 7 wherein the resilient force device is a spring.
15. The rotatable roller press and brush assembly of claim 14 wherein the spring is a torsion spring.
16. The rotatable roller press and brush assembly of claim 14 wherein the spring is a helical spring. The rotatable roller press and brush assembly of claim 7 wherein the resilient force device is a spring assembly.
17. A manure separator comprising:
 - a shell;

a weir box in fluid communication with the shell for providing influent to the separator;

a first section within the shell in fluid communication with the weir box comprising a first screen and a rotating brush assembly, the brush assembly comprising a plurality of first brushes and a plurality of arms, each first brush of the plurality of first brushes being attached to an arm of the plurality of arms, and each arm of the plurality of arms being rotatably carried by a first main axle mounted in the shell adjacent the first screen, each arm of the plurality of arms having a first central axis, and each first brush of the plurality of brushes having a first angle in the range of about 30 degrees to about 60 degrees between the first central axis and the plurality of first brushes away from a direction of rotational travel of the plurality of first brushes for directing solid influent from the first section to the second section;

a second section within the shell adjacent to and in fluid communication with the first section, comprising a second screen and a rotating roller press and brush assembly, the roller press and brush assembly comprising:

a main arm having two ends being rotatably carried by a second main axle mounted in the shell adjacent the second screen;

a plurality of brush sub-assemblies attached to and extending away from the main arm, each brush sub-assembly of the plurality of brush sub-assemblies comprising a brush arm having a second central axis and an end opposite the main arm and a second brush attached adjacent the end of the brush arm, each second brush of the plurality of second brushes having a second angle in the range of about 0 degrees to about 45 degrees between the second central axis and the plurality of second brushes in a direction of rotational travel of the plurality of second brushes;

a plurality of roller press sub-assemblies comprising a roller sub-assembly arm having a first end, a second end for rotatably carrying a

roller adjacent the first end, each of the plurality of roller press sub-assemblies being rotatably carried between the first end and the second end of the roller sub-assembly arm adjacent one of the two ends of the main arm;

a spring assembly attached to the roller sub-assembly arm for urging the roller in a direction away from the second main axle; and

a stop screw and a mechanical stop secured to the main arm to adjustably position the roller a predetermined distance from the main axle;

a driving means connected to the brush assembly and the main arm for urging the brush assembly and the main arm into a predetermined rotational movement;

a sump in fluid communication with the first section and the second section for draining liquid influent from the first section and the second section; and

a discharge section in communication with the second section for discharging solid influent from the second section.

18. The separator of claim 18, wherein the shell further comprises a duct collar.
19. The separator of claim 18, wherein the shell further comprises clamshell doors.
20. The separator of claim 18, wherein the shell further comprises a plurality of channels, the channels being configured and disposed to accommodate forklift forks.
21. The separator of claim 18, wherein the rollers comprise ultra high molecular weight plastic.
22. A manure separator comprising:
 - a shell;
 - a weir box comprising a slurry supply section for providing slurry to the separator;

a first section within the shell comprising a first screen and a rotatable brush assembly, said brush assembly comprising a plurality of brushes and a plurality of arms, each brush being attached to an arm, and each arm being attached to a first axle mounted over the first screen, said arms of the first section being substantially linear, and each brush of the said first section being angled at an angle in the range of about 30 degrees to about 60 degrees away from the arms toward a second section for directing solid influent from the first section to a second section;

the second section within the stainless steel shell comprising a second screen, said second screen comprising stainless steel woven wire mesh, and a rotatable roller press assembly, said roller press assembly being mounted to a second axle mounted over the second screen, said second section being positioned adjacent to said first section, said roller press assembly comprising a plurality of arms, a plurality of brush assemblies attached to said arms, and a plurality of roller sub-assemblies attached to said arms, each of said roller sub-assemblies comprising a center pivot, a first end and a second end, a roller being attached to each first end and a spring assembly attached to each second end, each spring assembly being further attached to one of the brush assemblies;

a plurality of ultra high molecular weight bearings, said bearings being mounted on the shell, the bearings supporting the first main axle and the second main axle;

an electric motor to urge the brush assembly and the roller press assembly into a predetermined rotational movement;

a sump for draining liquid slurry components from the separator; and

a solids discharge section for discharging solid slurry components from the second section.

23. The separator of claim 22, wherein each brush of the first section is angled at about 45 degrees.

24. The separator of claim 22, wherein the shell further comprises a duct collar.
25. The separator of claim 22, wherein the shell further comprises clamshell doors.
26. The separator of claim 22, wherein the shell is comprised of stainless steel.
27. A manure separator comprising:
 - a shell composed of stainless steel;
 - a weir box comprising a slurry supply section for providing slurry to the separator;
 - a first section within the shell comprising a first screen comprising stainless steel woven wire mesh and a rotatable brush assembly, said brush assembly comprising a plurality of brushes and a plurality of first arms, each brush being attached to a first arm, and each first arm being attached to a first stainless steel axle mounted over the first screen, said first stainless steel axle being rotatably carried by removable bearings composed of ultra high molecular weight plastic, said first arms of the first section being substantially linear, and each brush of the said first section being angled at an angle in the range of about 30 degrees to about 60 degrees away from the first arms toward a second section for directing solid influent from the first section to a second section;
 - the second section within the stainless steel shell comprising a second screen and a rotatable roller press assembly, said roller press assembly being mounted to a second stainless steel axle mounted over the second screen, said second stainless steel axle being rotatably carried by removable bearings composed of ultra high molecular weight plastic, said second section being positioned adjacent to said first section, said roller press assembly comprising a plurality of second arms, a plurality of brush assemblies attached to said second arms, and a plurality of roller sub-assemblies attached to said second arms, each of said roller sub-assemblies comprising a center pivot, a first end and a second end, a roller composed of ultra high molecular weight plastic being attached to each first end and a spring assembly attached to each second

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end, each spring assembly being further attached to one of the brush assemblies;

an electric motor to urge the brush assembly and the roller press assembly into a predetermined rotational movement;

at least one clamshell lid pivotably mounted to the shell, said at least one clamshell lid being in fluid communication with a source of warm air for heating the separator;

a sump for draining liquid slurry components from the separator; and

a solids discharge section for discharging solid slurry components from the second section.